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09/839,097	04/20/2001	Ashish Verma	JP920000446US1	1738

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EXAMINER
WEST, JEFFREY R

ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 10/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/839,097	VERMA ET AL.
	Examiner	Art Unit	
	Jeffrey R. West	2857	$\mathcal{PW}$

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>22 October 2004</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>14-32</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>14-32</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>21 November 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 29 is objected to because of the following informalities:

In claim 29, lines 2-3, to avoid problems of antecedent basis, "each sample"

should be ---each data sample---.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 14-32 are rejected under 35 U.S.C. 112, first paragraph, as failing to

comply with the enablement requirement. The claim(s) contains subject matter

which was not described in the specification in such a way as to enable one skilled

in the art to which it pertains, or with which it is most nearly connected, to make

and/or use the invention.

Independent claim 14 includes limitations for "assigning confidence values for

each classifier in said decision fusion application based on said greatest in value;

and improving a classification accuracy of said decision fusion application based on

said confidence values." These limitations, however, are not sufficiently described in

the specification to enable one having ordinary skill in the art to use the invention.

The specification includes sample confidence values L_{ij} and overall confidence

values H_i and does not include support for assigning confidence values based on a

greatest in value. The overall method of the invention is described on page 30, lines

6-20, of the substitute specification. This passage describes "[f]or every incoming

sample j, sample confidence values L_{ij} (1 ≤ i ≤ IICII) are computed for every classifier

i. The overall confidence H_i for the classes C are updated using L_{ij}. Preferably, a

weight w_{ij} is assigned to each classifier i as a function of the overall confidence H_i

and the sample confidence L_{ij}. Once weights w_{ij} for each classifier are known, each

incoming sample j can be classified in a class k by calculating the combined log-

likelihood CL_{jk} for each class k, as set out directly below.

$$CL_{jk} = \sum_{i=1}^{c} w_{ij} * 1_{ijk}$$

where $w_{ij} = f(L_{ij}, H_i)$. For the sample j, the class k with the highest calculated

combined log-likelihood CL_{jk} is finally chosen as the correct class k for sample j."

As seen in this passage, the confidence values L_{ij} and H_i are not assigned to each

classifier based upon any greatest value. Instead, the confidence values are used in

the calculation of w_{ij}, for use in the calculation of a combined log-likelihood CL_{jk},

which is then chosen as the correct class based when it is the highest of a plurality

of combined log-likelihood values. This does not sufficiently support a limitation for

"assigning confidence values for each classifier in said decision fusion application

based on said greatest in value" and therefore one having ordinary skill in the art would not be enabled to use the invention as claimed.

Other sections of the specification that describe the overall operation of the invention include page 28, lines 5-24 and page 31, lines 10-18, of the substitute specification.

Page 28, for example, describes "[a] weight or metric of relative confidence is computed for every classifier by determining its sample confidence and overall confidence (as subsequently described). For each class, an overall score (or likelihood) is calculated which combines individual scores from all classifiers, which allows the class with the highest score (or likelihood) to be designated as the correct class." This section also indicates that the confidence values are assigned for each classifier and are subsequently used for determining which weighted summation is greatest in value. Therefore, this section cannot support a limitation for using the weighted summation to determine a greatest value and using the greatest value to assign the confidence values.

Similarly, page 31 describes, "[i]nitially, in step 10, the process involves calculating a metric of relative confidence values for respective classifiers or class models which predict how a sample should be recognized. L_{ij} is calculated in step 20 as an L-statistic of the log-likelihoods l_{ijk}, as detailed below. The moving average H_i, across a suitable number of samples j is then determined in step 30. This allows weights W_{ij} to be calculated in step 40 for each classifier using H_i and L_{ij}, according to a suitable function as detailed below. The combined likelihoods across classifiers

CL_{jk} are then calculated in step 50 as a weighted summation of the likelihoods of each class, so that the most likely class can then be determined in step 60."

It can again be seen that the confidence values are assigned to classifiers in order to determine a weighted summation. This does not enable one having ordinary skill in the art to use a weighted summation to determine a greatest value and then using the greatest value to assign the confidence values.

Claim 20 and 26 are also rejected under 35 U.S.C. 112, first paragraph, because they recite similar limitations.

Claims 15-19, 21-25, and 27-32 are rejected under 35 U.S.C. 112, first paragraph, because the incorporate the lack of enablement present in their respective parent claims.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 14-32 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14 includes a limitation for assigning confidence values based on "said greatest in value" but does not define any value for "said greatest in value". The claim does present a limitation for "designating said data sample as belonging to said particular class for which said weighted summation is greatest in value" but this limitation does not provide any tangible value, but instead determines which

weighted summation is greatest in value relative to a plurality of other weighted

summations. This limitation is a comparison that does not arrive in a specific value.

Since there is no specific value presented, it is unclear to one having ordinary skill in

the art to what whether "said greatest in value" refers to the weighted summation or

a value resulting from the comparison, and therefore it is unclear how to assign

accuracy confidence values based on "said greatest in value".

Claims 20 and 26 are also rejected under 35 U.S.C. 112, second paragraph,

because they recite similar limitations.

Claims 15-19, 21-25, and 27-32 are rejected under 35 U.S.C. 112, second

paragraph, because they incorporate the lack of clarity present in their respective

parent claims.

Response to Arguments

6. Applicant's arguments filed October 22, 2004, have been fully considered but

they are not persuasive.

Applicant argues, regarding the enablement rejection under 35 U.S.C. 112, first

paragraph, "that it is clearly defined via case law that a prima facie case of

enablement is, in part, based on one of ordinary skill in the pertinent art, and thus

the application need be written only for one of ordinary skill, and not for the novice.

Accordingly, not every last detail is to be described otherwise the patent

specification would turn into a production specification, which they were never

intended to be. Further, the Applicant submits that one of ordinary skill in the

pertinent art regarding this invention, which is highly technical, would need a great

skill level not a level of a novice computer programmer. It, therefore, would be

unreasonable to apply a different standard in this situation."

Applicant then argues that "the Application lays out a mathematical framework,

which allows one of ordinary skill in the art (more than a novice) to understand the

invention. In particular, one of ordinary skill would clearly understand that the

amended claim language, for example in claim 14, of 'assigning the confidence

values for each classifier in the decisions fusion application based on the greatest in

value' is supported by the language in the Substitute Specification on Page 30, lines

6-15, including '[p]referably, a weight w_{ij} is assigned to each classifier i as a function

of the overall confidence H_i and the sample confidence L_{ij}.' Thus, Applicants rebut

the enablement rejection as being insufficient for meeting the prima facie case of

lacking enablement as the claims in view of the specification have been interpreted

using a lower, i.e., or novice standard, not the required standard of 'one of ordinary

skill in the pertinent art'."

The Examiner asserts that the passage "[p]referably, a weight w_{ij} is assigned to

each classifier i as a function of the overall confidence H_i and the sample confidence

L_{ij}," to which Applicant refers, does not enable one having ordinary skill in the art to

perform the claimed limitation of "assigning the confidence values for each classifier

in the decisions fusion application based on the greatest in value".

The Examiner agrees that the weight w_{ij} is a function of the confidence values H_i and L_{ij}, as noted in the previous Office Action. The Examiner is asserting that assignment of confidence values is performed before any greatest value is determined and therefore cannot be assigned "based on said greatest in value" as claimed.

As set out on page 30, lines 6-20, of the substitute specification, "[f]or every incoming sample j, sample confidence values L_{ij} ($1 \leq i \leq \|C\|$) are computed for every classifier i. The overall confidence H_i for the classes C are updated using L_{ij}. Preferably, a weight w_{ij} is assigned to each classifier i as a function of the overall confidence H_i and the sample confidence L_{ij}. Once weights w_{ij} for each classifier are known, each incoming sample j can be classified in a class k by calculating the combined log-likelihood CL_{jk} for each class k, as set out directly below.

$$CL_{jk} = \sum_{i=1}^{c} w_{ij} * 1_{ijk}$$

where $w_{ij} = f(L_{ij}, H_i)$. For the sample j, the class k with the highest calculated combined log-likelihood CL_{jk} is finally chosen as the correct class k for sample j."

Page 28, lines 5-24, similarly describes "[a] weight or metric of relative confidence is computed for every classifier by determining its sample confidence and overall confidence (as subsequently described). For each class, an overall score (or likelihood) is calculated which combines individual scores from all

classifiers, which allows the class with the highest score (or likelihood) to be designated as the correct class."

These passages specifically describe that the confidence values are assigned for each classifier and are subsequently used for determining which weighted summation is greatest in value. Therefore, these passages cannot support a limitation for using the weighted summation to determine a greatest value and using the greatest value to assign the confidence values.

This lack of enablement is considered to be crucial to the examination of the instant invention because, in the Response filed April 19, 2004, Applicant argues that this claimed feature overcomes the cited prior art rejection, stating, "[i]n the present application, the reason given to support the proposed combination is improper, and is not sufficient to selectively and gratuitously substitute parts of one reference for a part of another reference in order to try to meet, but failing nonetheless, the Applicant's novel claimed invention. Furthermore, the claimed invention, as amended, meets the above-cited tests for obviousness by including embodiments such as assigning accuracy confidence values for each classifier in a decision fusion application based on the greatest value attributed to a weighed summation across a plurality of classifiers of a data sample".

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to

Applicant's disclosure.

U.S. Patent No. 6,539,353 to Jiang et al. discloses a method for performing

confidence measures using sub-word-dependent weighting of sub-word confidence

scores for robust speech recognition comprising computing a weight (i.e. a and/or b)

for each of a plurality of classifiers (i.e. $f_{class}(U_i)$) (column 6, lines 10-17), wherein the

classifiers indicate a manner of classifying a sample in one of a number of

predetermined classes (column 6, lines 4-5), calculating for each of a the

predetermined classes a weighted summation/confidence summation (i.e. the

summation of $f_{class}(U_i)(x_i)$) across the classifiers of a likelihood that the speech

sample belongs to a particular class, weighted by said weight value, (column 5, line

53 to column 6, line 1), and designating the speech sample as belonging to the class

for which the weighted summation confidence measurement indicates (i.e.

successfully fitting into one of the predetermined classes) (column 6, lines 18-23 and

38-44).

Jiang discloses that the weight value (i.e. a and/or b) for a classifier, specific to

each class with corresponding weights specific to each class and therefore specific

to each classifier, comprises a sample confidence component (column 7, lines 1-10)

calculated, in the same manner as above (column 7, lines 13-18), as a weighted

summation/confidence summation (i.e. the summation of $f_{class}(U_i)(x_i)$), and a

cumulative component comprising a mean, (i.e. CS(w)), of the weighted

summation/confidence summation across the classifiers, (i.e. $f_{class}(U_i)$), of the log

likelihoods (i.e. x_i) over a plurality of samples (i.e. a 1 to N) (column 5, line 53 to

column 6, line 1).

Further, since CS(w) is a cumulative mean of the confidence levels of the speech

samples over time, it is considered inherent that the cumulative mean is

successively updated with the sample confidence since the cumulative mean

summation is the summation of each new confidence level obtained.

Jiang also discloses performing the method using an input means to receive data

(column 3, lines 3-12) and a processor means, with associated code stored on a

computer readable medium, for executing the processing (column 2, lines 30-35 and

44-56).

U.S. Patent No. 5,880,767 to Liu teaches a perceptual image resolution

enhancement system for processing and sharpening various types of images by

filtering the input image to extract a plurality of components (column 1, lines 41-56)

and classifying the data for adaptive sharpening of the image (column 2, lines 17-28)

wherein the filtering is carried out using an nonlinear order static filter (i.e. L-filter) for

weighting the components as a sum of the defined coefficients multiplied by

ascendingly/descendingly ordered data (column 5, lines 10-25). Further the

invention of Liu only provides coefficients for the first two terms, and 0 for the rest of

the terms, therefore providing a difference between the first and second choices that

are most likely.

Potamianos et al., "A cascade visual front end for speaker independent automatic speechreading" teaches a method for audio-visual recognition and classification.

Verma et al., "Late Integration in Audio-Visual Continuous Speech Recognition" teaches speech recognition through weighted classification.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is (571)272-2226. The examiner can normally be reached on Monday through Friday, 8:00-4:30.
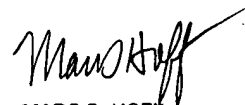
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (571)272-2216. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jrw
October 27, 2004

MARC S. HOFF
SUPERVISORY PATENT EXAMINER
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